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thin, and transparent, so that the chief organs within were visible through it. There were no eye-spots. The mouth, when expanded, appeared as an ovoid sucker, with the orifice somewhat diamond-shaped; and it was neither armed with teeth, nor provided with a proboscis. The oesophagus is narrow, and opens into a capacious stomach, which forms ten or eleven horizontal discoid saccules, which were filled with a blackish-brown liquid, apparently blood. The stomach is surrounded by eight tortuous, gland-like organs, which extend the entire length of the body, and give rise to the colored stripes seen through the skin. These organs are composed of numerous pyriform acini, and appear like racemose glands, but their nature I did not determine. The specimens were preserved in alcohol with the view of further investigation, but they have softened to such a degree that the examination has proved unsatisfactory. From the conspicuous gland-like organs and the habit of the leech, I propose to name it *Adenobdella oricola*.

In the stomach of the same fish there were some little tape-worms, which I suppose to be the *Taenia torulosa*, originally described from European species of *Leuciscus* and other species of the same family. The worms were white, filiform, compressed cylindrical, and from three to six inches long. The head is oval, without rostrum or hooks, and with four equidistant, spherical, immersed bothria. The neck is narrowed and moderately long. The body widens to the posterior fourth, and then gradually narrows. The segments are wider than long, and not prominent. The generative apertures are marginal, with the penes projecting; diameter of the head, one-third of a line; greatest breadth of the body, three-fourths of a line.

JOSEPH LEIDY.

Mortality experience of life-insurance companies.

That figures have a great capacity for lying, and that nothing needs closer watching than an argument based on statistics, are facts which ought to be well impressed on everybody's mind. On almost every subject of public importance,—politics, finance, economic policy, social science,—one is continually solicited to believe in this or that doctrine because statistics 'prove' it to be true. And a large part of the error that prevails on many of these subjects—notably, on the question of free trade and protection—is due, on the one hand, to the reckless way in which statistics are handled by writers, and, on the other, to the absence among their readers of a wholesome suspicion of statistical arguments, and of the abiding consciousness that statistics do not always mean what they seem at first sight to say.

Such being the case, it is a pity that Professor Newcomb—than whom surely no one is more free from the mental defects to which these errors are usually due—should have made so many slips in a recent article in *Science* on mortality statistics. One cannot help asking whether Homer's nods come, like misfortunes, many at a time.

A curious logical slip occurs in the passage relating to the influence of occupation upon mortality. "How little mere occupation has to do with viability, is shown by the fact, that, while bankers and capital-

ists suffer one-fourth less, brokers, speculators, and operators suffer twelve per cent more, than the tabular mortality." In other words, from the fact that in two occupations seemingly very similar the rates of mortality are widely different, the inference is drawn that occupation has little or nothing to do with the matter. Obviously, the true inference is, that either the statistics are inadequate to the making of the comparison in question, or that the occupations which seemed to be similar are really widely different. If we are sure the occupations are practically alike, we must conclude that the statistics are insufficient, or subject to a bias: if we are sure that the statistics are sufficient and impartial, we must conclude that some important difference is to be found in the occupations; and, in point of fact, there is a very striking difference between the calling of an operator in stocks and that of a legitimate banker or sound capitalist.

In the same paragraph we are told that travelling-agents have the greatest viability of all. This is somewhat surprising; but the fact is deprived of all significance when one finds, on turning to the tables, that the total number of deaths in this class was only eight. So with regard to the excessive mortality of the younger class. The whole number of deaths between the ages of seven and twenty is forty-seven, as Professor Newcomb mentions, while the American table would make it thirty-three. An aggregate excess of fourteen deaths is too slender a basis to rest any inference upon, and is not so surprising as to render an explanation absolutely necessary. It happens, however, that it is in a great measure explained by the fact that (as pointed out in the text accompanying the tables) almost the entire excess occurs among the lives insured under term-policies; i.e., policies issued to extend over a particular period only, and taken for the purpose of covering special risks.

As to the most important point discussed by Professor Newcomb,—whether Herbert Spencer, and those who share his 'superstition,' are right in believing that the most active and enterprising Americans injure their health, and shorten their lives, by too great devotion to business,—I cannot think that these mortality statistics are any thing like a 'sure test' of the question. The class referred to is mixed up with other classes; and, unless we can compare the mortality in this class with the mortality in the same class in England, our inferences must be very guarded indeed. Moreover, there are many things affecting selection—strictness of examination, privilege of surrender, popularity of life insurance—which may greatly differ in the two countries, and largely influence the result. The great excess of mortality in the case of term-policies, and the considerable deficiency in the case of paid-up policies, shown by the Connecticut mutual tables, are instances of this sort of phenomenon. And, even if we were in possession of a perfectly fair comparison with Englishmen, it would still remain to consider whether Americans would not, in the absence of habits complained of, compare still more favorably with Englishmen. On the question of the effect of overwork, and worry, and ambition to become rich, a little bold *a priori* reasoning is likely to lead to a sounder result than can be derived from statistics not specially designed to test the question. It may be remarked, as throwing some light on the matter, that the actuary of the Connecticut company, after observing that between the ages of fifty-six and seventy-five an undue proportion of the deaths occur among those insured for large amounts, adds, "These results suggest the question whether those who insure for large amounts—often, perhaps generally, men of good incomes,



and living well, but involved in the cares, and burdened with the responsibilities, of great business enterprises — are more liable than other men to break down and die at about these latter ages." The comparison here instituted — between Americans who belong to the classes to which Herbert Spencer's strictures chiefly refer, and other Americans — seems much more likely to lead to a reliable result than a comparison between Americans and Englishmen. F. F.

An attempt to photograph the solar corona.

Judging by the tone of Dr. Huggins's communication in *Science* for May 15, I think he fails to understand a point I particularly emphasized in my communication of April 3; namely, that I was not criticising his work, but merely stating the results of my own investigations. I have not, as yet, had an opportunity to experiment with a reflector; but, when we consider the greater visibility of minute companions of bright stars in refractors as compared with reflectors, it does not seem evident how chromatic aberration and internal reflection from the surfaces of a lens can totally unfit it for work, which, according to Dr. Huggins, is perfectly possible for a reflector. In the mean time, an account of some experiments which I have recently made with my refractor may be of interest.

Dr. Huggins suggests that the dark fringe on the negative, which was obtained around the sun, is largely due to diffraction at the instants of opening and closing my shutter. If this were so, the darkening should extend farthest, and be most marked in the direction parallel to the line of motion of the shutter, and should be almost *nil* in the direction at right angles to this line. A careful inspection of my results shows no such effect, the greatest darkening lying sometimes in one direction, and sometimes in another. I therefore think that this objection, although theoretically sound, is not of practical importance with my apparatus. The real causes which would tend to produce a dark fringe around the sun's image are fourfold, and may be classified as follows: (a) the solar corona, (b) the atmospheric reflection, (c) instrumental defects, (d) photographic properties of the plate. In the last class I include chemical reduction of the particles of the silver salt contiguous to reduced particles of metallic silver; also halos produced by insufficient backing, and irregularities in the film itself. At the time of a partial solar eclipse, the effect of the corona alone is removed from around a portion of the sun's limb, the other three causes of the darkening remaining. By photographing the sun when its disk is half hidden behind a high neighboring building, the first two causes alone of the darkening are removed. By pasting a strip of black paper across the middle of the plate in such a position that the sun's image shall fall, half on the paper, and half on the plate, and then, before development, removing the paper, the first three causes alone of the darkening will be removed, leaving the fourth. By these devices the effect of each of these four causes has been sifted out, and the relative importance of each determined.

Dr. Huggins claims that my results are due almost wholly to instrumental defects, and not to atmospheric reflection. In this I think he is mistaken. The dark fringe is in part due to both causes; but, even in the clearest weather, the part due to atmospheric reflection is still prominent. Dr. Huggins says, "When the sky is free from clouds, but white from a strong scattering of the sun's light, the sun is well defined upon a *sensibly uniform*¹ surrounding of air-glare, but

¹ The italics are my own.

without any indication of the corona. It is only when the sky becomes clear and blue in color that coronal appearances present themselves with more or less distinctness." I do not know what to make of this statement; for it certainly runs counter to all that one would naturally expect, to all visual experience, and to all my photographic results. As every one knows, whether the sky is clear or hazy, that portion of it in the immediate vicinity of the sun is considerably brighter than those portions more remote. To test the matter photographically, on a hazy day such as he describes, I took a picture of the sun when it was half hidden behind a high building. If, as he claims, the dark fringe was due solely to instrumental defects, it should be equally well marked all round the semicircular image of the sun. If, on the other hand, it were due solely to atmospheric reflection, the part protected by the chimney should be entirely devoid of halo. On development, a very strong halo surrounded the sun's image, going as far round as the brick wall. Here it abruptly ceased, and was replaced by a barely perceptible darkening along the straight side of the image. This increase of brilliancy on approaching the sun's limb was very marked. This appearance can be verified by any one visually with a piece of colored glass. It therefore appears evident that a great part of the corona-like fringe shown in my photographs is due to causes outside of the instrument, and hence cannot be diminished by changes in the latter. On the photographs taken at the time of the eclipse, the fringe was as strongly marked in front of the moon as on the other side of the sun. It therefore appears that the effect of the corona was imperceptible as compared with the effect of the other sources of light, although the atmospheric conditions were exceptionally favorable. On a clear day the atmospheric reflection is less marked than on a hazy one, but is still always present. I hope soon to repeat the experiment with an instrument closely resembling that of Dr. Huggins, although the advantages of his form of apparatus do not seem very evident to me.

There are one or two points raised in Dr. Huggins's article which should be answered here. As stated in *Science*, April 17, all the plates employed were backed with asphalt varnish. The image of the sun obtained through the violet glass was not reversed, although there is no question but that it would have been, as Dr. Huggins suggests, by a longer exposure. I did not care for a 'different result,' and merely made the statement as one of the facts observed under the conditions named. Dr. Huggins objects to my reference to Dr. Lohse, maintaining that his 'published statement reads differently.' But, in fact, Dr. Lohse only states, that, after overcoming certain difficulties, results were obtained which justify a continuation of the experiments. He does not state that he considers his results coronal, but merely that a continuation of the experiments would be desirable, in which statement I thoroughly agree with him. As I do not feel at liberty to print a private letter, I have written to Dr. Lohse for an exact expression of his views.

WM. H. PICKERING.

Institute of technology, Boston, Mass.

A BRONZE MEDALLION PORTRAIT OF DR. ASA GRAY.

WE present to our readers on the opposite page a faithful copy of the admirable bronze medallion, by Saint Gaudens, of Professor Asa